RAD
data communications

Installation and Operation Manual

RIC-E3/ETH, RIC-T3/ETH

10/100BT to E3/T3 Interface Converters

RIC-E3/ETH, RIC-T3/ETH

10/100BT to E3/T3 Interface Converters

Installation and Operation Manual

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Regulatory Information

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to the radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning per EN 55022

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Safety Information

Safety Warnings

Warning

The exclamation point within a triangle is intended to warn the operator or service personnel of operation and maintenance factors relating to the product and its operating environment which could pose a safety hazard.

Always observe standard safety precautions during installation, operation and maintenance of this product. Only a qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this instrument. No adjustment, maintenance or repairs should be performed by either the operator or the user.

Telecommunication Safety

The safety status of each of the ports on the RIC-E3/ETH, RIC-T3/ETH is declared according to EN 41003 and is detailed in the table below:

Ports	Safety Status	
Electrical E3/T3, Ethernet	SELV	Circuit operating with Safety Extra-Low Voltage

Declaration of Conformity

Manufacturer's Name: RAD Data Communications Ltd.

Manufacturer's Address: 24 Raoul Wallenberg St.
Tel Aviv 69719
Israel

declares that the products:

Product Name: RIC-E3/ETH, RIC-T3/ETH

Conform to the following standard(s) or other normative document(s):

EMC:	EN 55022 (1994)	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
	EN 55024 (1998)	Electromagnetic compatibility – Generic immunity standards for residential, commercial and light industry.
Safety:	EN 60950/A4 (1996)	Safety of information technology equipment, including electrical business equipment.

Supplementary Information:

The products herewith comply with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC. The products were tested in a typical configuration.

Tel Aviv, April 3rd, 2001

Haim Karshen
VP Quality

European Contact: RAD Data Communications GmbH, Otto-Hahn-Str. 28-30, 85521 Ottobrunn-Riemerling, Germany

Quick Start Guide

If you are familiar with RIC-E3/ETH and RIC-T3/ETH interface converters, use this guide to prepare the units for operation.

1. Installing RIC-E3/ETH and RIC-T3/ETH

Open the RIC-E3/ETH or RIC-T3/ETH case by releasing the two rear panel screws and sliding out the PCB interior of the unit.

Setting the Internal Jumpers

Setting the Main Board Jumpers

Set the main board jumpers according to the following table:

Jumper	Description	Values	Factory Setting
TIMING, JP1	Selects the clock source	**LBT** – Receive clock	
		INT – Internal clock	INT
AIS, JP2	Controls the AIS transmission	**ON** – AIS is transmitted	ON
		OFF – AIS is not transmitted	

Selecting the E3/T3 Cable Length

Refer to the tables below and select the cable length, depending on your unit's interface type: E3 or T3.

Jumper	Description	Values	Factory Setting
E3 Cable Length Jumper, JP2	Selects the E3 cable length	**Pins 1, 2** – Cable length is from 0 to 300 ft	Pins 1, 2
		Pins 2, 3 – Cable length is more than 300 ft	

***Note**: The maximum cable length complies with ITU-T G.703.*

T3 Cable Length	Jumper Positions		
	JP1	JP2	JP3
0 ft – 225 ft	Pins 2, 3*	Pins 1, 2*	Pins 2, 3*
225 ft – 450 ft	Pins 1, 2	Pins 1, 2	Pins 1, 2
More than 450 ft	Pins 1, 2	Pins 2, 3	Pins 1, 2

***Note**: The maximum cable length complies with ITU-T G.703.*

* – Factory settings

Configuring the Ethernet Interface

Configure the Ethernet interface according to the tables below:

Section	Name	Description	Possible Settings	Factory Setting
1	NC			OFF
2	FLC	Enables or disables flow control	**ON** – Flow control is enabled	
			OFF – Flow control is disabled	OFF
3	10/100	Selects the LAN speed	**ON** – LAN speed is 100 Mbps	
			OFF – LAN speed is 10 Mbps	OFF
4	AN1	Controls the LAN autonegotiation	**ON** – LAN autonegotiation is disabled	
			OFF – LAN autonegotiation is enabled	OFF
5	HF1	Selects the LAN mode	**ON** – LAN full duplex mode	
			OFF – LAN half duplex mode	OFF
6	BPR	Controls the backpressure	**ON** – Backpressure is enabled	
			OFF – Backpressure is disabled	OFF
7	MUL	Controls LAN to WAN multicasting	**ON** – Multicast messages from LAN to WAN are blocked	
			OFF – Multicast messages from LAN to WAN are not blocked	OFF
8	SCR	Controls the scrambling of Ethernet frames	**ON** – Ethernet frames are scrambled	
			OFF – Ethernet frames are left unchanged	OFF

Connecting the Cables

➤ **To connect cables:**

1. Connect the E3 or T3 electrical interface.
2. Connect the Ethernet interface to the LAN.
3. Connect the power cable (first to the converter, then to the mains supply).

2. Operating RIC-E3/ETH and RIC-T3/ETH

Verify LED status:

- The PWR LED should be ON.
- The LINK and ACT LEDs should be ON, when the link to the LAN is established, and data is transferred over the Ethernet link.
- The ETH 100 LED is ON when the converters work in the 100 Mbps mode.

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Chapter 1
Introduction

1.1 Overview

RIC-E3/ETH and RIC-T3/ETH are interface converters, which convert between unframed E3/T3 data and 10/100BaseT Ethernet. RIC-E3/ETH and RIC-T3/ETH offer simple and cost-effective interconnection between 10/100BaseT LANs and E3/T3 services, making distant LANs operate as one local network.

Versions

Two converter models are available:

- RIC-E3/ETH: E3 to 10/100BaseT converter
- RIC-T3/ETH: T3 to 10/100BaseT converter.

Power Options

- AC power supply: 100 to 240 VAC
- DC power supply: -48 VDC.

Applications

RIC-E3/ETH and RIC-T3/ETH provide logical connection of the distant LANs, as shown in *Figure 1-1*.

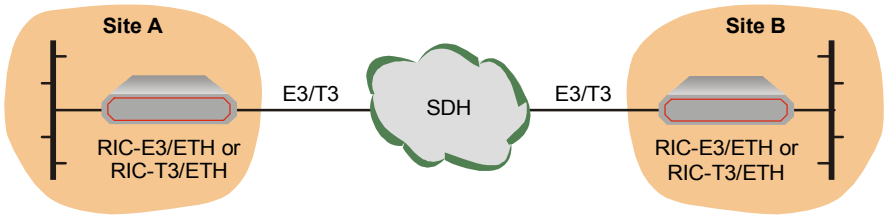

Figure 1-1. Logical Connection of Distant LANs

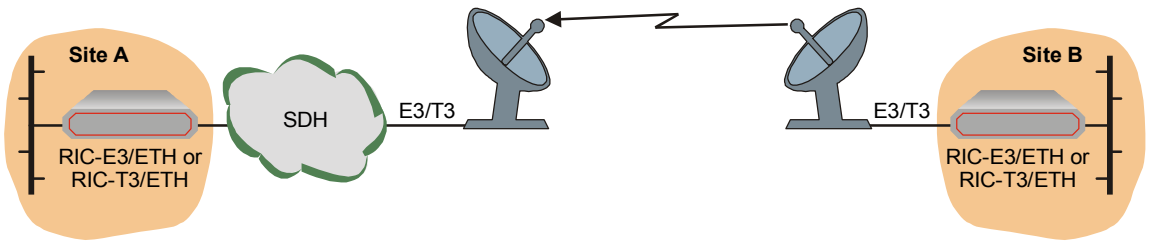

Figure 1-2. Connecting LAN to E3/T3 Service over Wireless Link

Figure 1-3 shows RIC-E3/ETH and RIC-T3/ETH providing a cost-effective link to the Internet Service Provider (ISP) by using a low-cost or existing 10/100BT connection instead of expensive E3/T3 router interface.

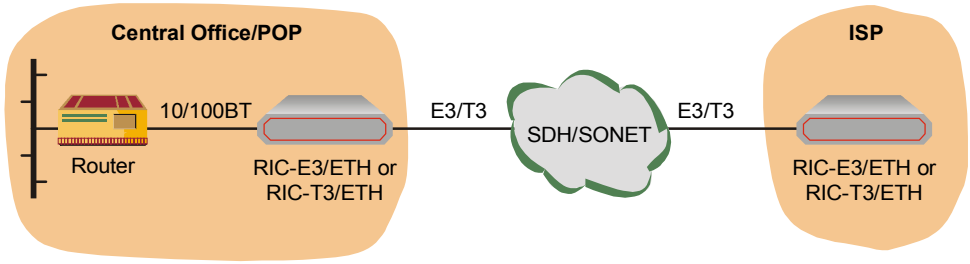

Figure 1-3. Cost-effective Connection to ISP

Features

RIC-E3/ETH and RIC-T3/ETH transparently connect an unframed E3 or T3 link with a 10/100BaseT Ethernet system, utilizing the full E3/T3 bandwidth without the heavy overhead associated with packet or cell-based technologies.

E3/T3 Interface

The E3 coax interface uses HDB3 line coding and fully complies with the applicable ITU-T standards. The E3 interface terminates in two shielded unbalanced BNC connectors.

The T3 coax interface uses B3ZS line coding and fully complies with the requirements of ITU-T G.703 and G.824 standards. The T3 interface terminates in two shielded unbalanced BNC connectors.

Ethernet Interface

The Ethernet interface of the RIC-E3/ETH and RIC-T3/ETH converters is a high performance self-learning Ethernet bridge module, fully compatible with IEEE 802.3/Ethernet V.2 standards.

Ethernet interface provides one LAN connection, which can be either 10BaseT (UTP) or 100BaseT (UTP), both with VLAN tagging support.

The LAN link operates at a data rate of up to 10 Mbps for 10BaseT ports or up to 100 Mbps for 100BaseT ports.

Auto-negotiation allows plug-and-play Ethernet connection.

The Ethernet module is configured via an internal DIP switch.

1.2 Physical Description

Figure 1-4 illustrates a 3-D view of the RIC-E3/ETH and RIC-T3/ETH units.

Figure 1-4. RIC-E3/ETH and RIC-T3/ETH, 3-D View

The RIC-E3/ETH and RIC-T3/ETH front panel contains LEDs for indication of the E3/T3 and Ethernet interface status. For details, refer to *Chapter 3*.

The rear panel of the unit allows access to the interface, alarm relay and power connections. The rear panel is described in greater detail in *Chapter 2*.

1.3 Functional Description

Figure 1-4 illustrates the RIC-E3/ETH and RIC-T3/ETH functional diagram.

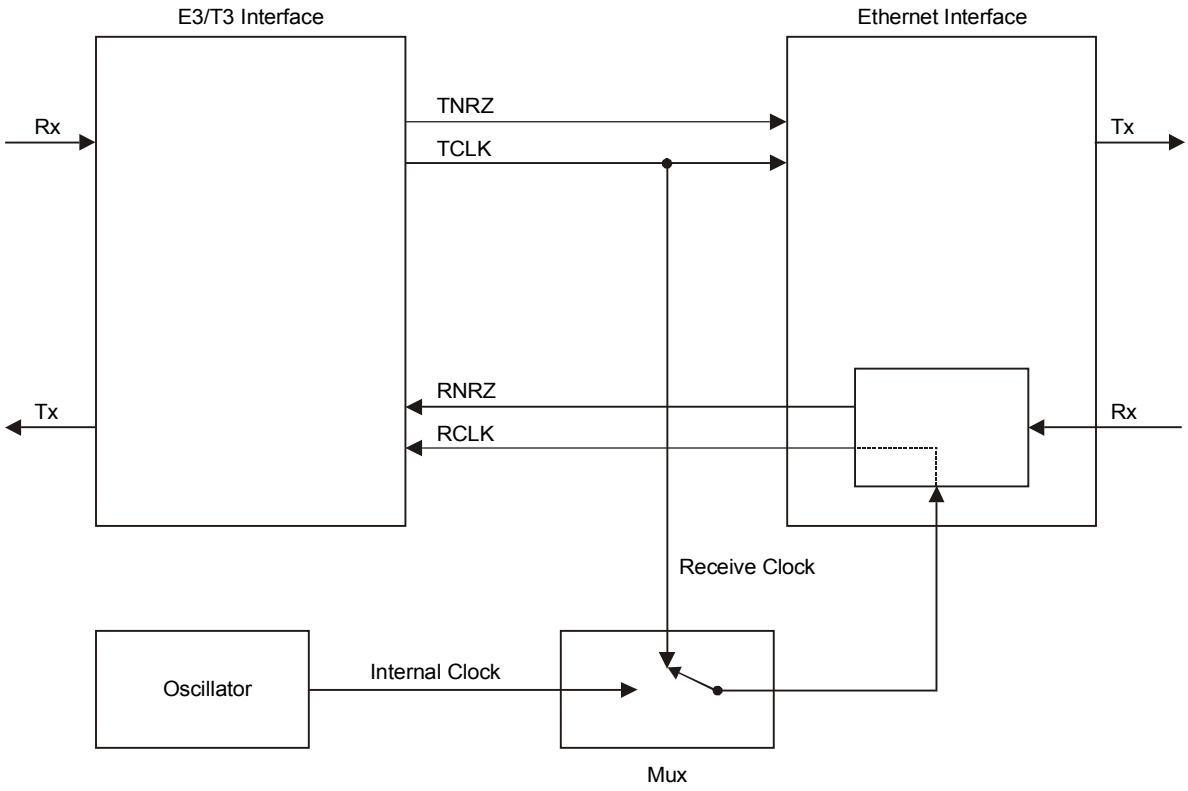

Figure 1-5. RIC-E3/ETH and RIC-T3/ETH Functional Diagram

E3 Interface

The E3 interface includes a line interface transceiver, which utilizes HDB3 encoding and decoding. The E3 interface operates at the 34.368 Mbps data rate. The line transceiver recovers clock and data from the incoming signals. The E3 cable length is user-selectable, and complies with ITU-T G.703 standards. The connectors are two shielded BNC connectors with 75Ω impedance.

T3 Interface

The T3 interface includes a line interface transceiver, which utilizes B3ZS encoding and decoding. The E3 interface operates at the 44.736 Mbps data rate. The line transceiver recovers clock and data from the incoming signals. The T3 cable length is user-selectable, and complies with ITU-T G.703 standards. The connectors are two shielded BNC connectors with 75Ω impedance.

Ethernet Interface

The Ethernet interface includes a high performance self-learning Ethernet bridge, which is connected to the LAN via a single 10BaseT or 100BaseT port, operating in half or full duplex.

The module automatically learns MAC addresses of the LAN to which it is connected. Its LAN table stores up to 1,000 addresses with 5-minute automatic aging.

Filtering and forwarding is performed at the maximum theoretical rate of 150,000 frames per second (wire speed). The bridge has an internal buffer for frames that is 16Kx32 (64 KB). The forwarding of the broadcast and multicast messages from LAN to WAN can be disabled.

Timing

Figure 1-5 shows flow of the clock signals in the RIC-E3/ETH and RIC-T3/ETH unit. Two timing modes are supported:

- Receive clock: the system timing is locked to the recovered receive clock signal coming from E3/T3 interface.
- Internal clock: an onboard crystal oscillator (±25 ppm) serves as the timing source for the system.

Alarm Relay

RIC-E3/ETH and RIC-T3/ETH feature an alarm port, used for the relay of the alarm conditions (AIS and LOW) by means of Normally Open and Normally Closed dry contacts, using different pins of the DB-9 port connector.

1.4 Technical Specifications

E3/T3 Interface	*Transmission Rate*	• E3: 34.368 Mbps • T3: 44.736 Mbps
	Line Code	• E3: HDB3 • T3: B3ZS
	Impedance	75Ω, unbalanced
	Connectors	Two shielded BNC (unbalanced)
Ethernet Interface	*LAN Table*	1,000 MAC addresses
	Aging	5 minute, automatic
	Filtering and Forwarding Rate	150,000 frames per second
	Buffer Size	170 frames

	Delay	1 frame
	LAN Standard	IEEE 802.3/Ethernet V.2
	LAN Data Rate	• 10BaseT: 10 Mbps (20 Mbps in full duplex) • 100BaseT: 100 Mbps (200 Mbps in full duplex)
	Transmission Line	4-wire, Category 5 UTP, 19 AWG to 26 AWG
	Line Code	• 10BaseT: Manchester • 100BaseT: MLT3
	WAN Protocol	Point-to-point
	Connector	RJ-45
Timing	*Clock Source*	• Receive clock: recovered from the receive clock signal coming from E3/T3 interface • Internal clock: provided by onboard crystal oscillator (±25 ppm)
Indicators	*PWR*	ON – RIC-E3/ETH or RIC-T3/ETH is powered up
	ELECTRICAL LOW	ON – E3/T3 input is below G.703 level
	ELECTRICAL AIS	ON – E3/T3 interface received Alarm Indication Signal
	ETH LINK	ON – LAN is connected to the Ethernet interface
	ETH ACT	BLINKS – LAN is receiving/transmitting data
	ETH 100	ON – LAN is operating at 100 Mbps OFF – LAN is operating at 10 Mbps
Alarm Relay	*Connector*	9-pin, D-type female
	Operation	Normally Open and Normally Closed, using different pins
Power	*AC Source*	100–240 VAC, 50 Hz–60 Hz, 15 VA
	DC Source	-48 VDC, 9W
Physical	*Height*	4.4 cm / 1.7 in
	Width	19.4 cm / 7.6 in
	Depth	24.3 cm / 9.6 in
	Weight	1.4 kg / 3.0 lb
Environment	*Temperature*	0 to 50°C (32 to 122°F)
	Humidity	Up to 90%, non-condensing

Chapter 2

Installation and Setup

This chapter describes installation procedures for the standalone RIC-E3/ETH and RIC-T3/ETH devices.

After installing the unit, refer to *Chapter 3* for the system operation information.

Refer to *Chapter 4* for troubleshooting and diagnostics information.

Warning

Internal settings, adjustment, maintenance, and repairs may be performed only by a skilled technician who is aware of the hazards involved.

Always observe standard safety precautions during installation, operation and maintenance of this product.

2.1 Site Requirements and Prerequisites

AC-powered RIC-E3/ETH and RIC-T3/ETH units should be installed within 1.5m (5 ft) of an easily-accessible grounded AC outlet capable of furnishing the required supply voltage, in the range of 100 to 240 VAC.

DC-powered RIC-E3/ETH and RIC-T3/ETH units require a -48 VDC power source, which must be adequately isolated from the mains supply. In order to prevent a fire hazard, a suitable fuse must be installed in the -48 VDC line.

The maximum trunk current of the AC or DC supply must be limited to 16A.

Allow at least 90 cm (36 in) of frontal clearance for operator access and at least 10 cm (4 in) clearance at the rear of the unit for interface cable connections.

The ambient operating temperature of RIC-E3/ETH and RIC-T3/ETH should be 0 to 50°C (32 to 122°F), at a relative humidity of up to 90%, non-condensing.

2.2 Package Contents

The RIC-E3/ETH or RIC-T3/ETH package includes the following items:

- RIC-E3/ETH or RIC-T3/ETH unit
- Interface Converters and Sharing Devices CD
- AC power cord or DC power supply connector kit

2.3 Installation and Setup

RIC-E3/ETH and RIC-T3/ETH are a standalone devices intended for tabletop or 19-inch rack installation. They are delivered completely assembled. No provision is made for bolting the unit on the tabletop.

➤ **To install RIC-E3/ETH or RIC-T3/ETH:**

1. Determine the required configuration of RIC-E3/ETH or RIC-T3/ETH according to your application, and set the internal jumpers and switches accordingly.
2. Connect the E3/T3 lines and the LAN.
3. Connect power to the unit.

Setting the Internal Jumpers

This section provides information on the functions of the RIC-E3/ETH and RIC-T3/ETH jumpers, and gives step-by-step instructions for performing the internal settings. The default settings are also listed.

Locations of Jumpers and Switches

RIC-E3/ETH and RIC-T3/ETH include three printed circuit boards (PCBs): the main board, E3/T3 interface board, and Ethernet interface board (see *Figure 2-1*, *Figure 2-2*, *Figure 2-3* and *Figure 2-4*).

The **main board** contains the common signal processing circuits. Two jumpers, JP1 and JP2, are provided for user settings.

The **E3/T3 interface boards** provide connection to the E3/T3 links. The E3/T3 boards contain jumpers for selecting the E3/T3 cable length.

The **Ethernet interface board** provides LAN connection. The Ethernet board contains an 8-section DIP switch for the interface configuration.

Opening the Case

To reach the internal jumpers and switch of RIC-E3/ETH and RIC-T3/ETH, it is necessary to open its case.

Warning

Access to the inside of RIC-E3/ETH and RIC-T3/ETH is permitted only to authorized and qualified service personnel.

To avoid accidental electric shock, always disconnect the interface cables and the power cord before removing the units from their casing.

Line voltages are present inside RIC-E3/ETH and RIC-T3/ETH when they are connected to power and/or to the lines. Moreover, under external fault conditions dangerous voltages may appear on the lines connected to the units.

Any adjustment, maintenance, and repair of the opened equipment under voltage should be avoided as much as possible and, when absolutely necessary, should be carried out only by a skilled technician who is aware of the hazard involved. Capacitors inside the instruments may still be charged even after the instruments have been disconnected from their power source.

Caution RIC-E3/ETH and RIC-T3/ETH contain components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components. Before moving jumpers, touch the RIC-E3/ETH or RIC-T3/ETH frame.

➤ **To open the RIC-E3/ETH or RIC-T3/ETH case:**

1. Disconnect all the cables connected to RIC-E3/ETH or RIC-T3/ETH.
2. Release the two rear panel screws and use them as levers to slide out the PCB interior of the unit.

Setting the Main Board Internal Jumpers

The internal jumpers located on the RIC-E3/ETH or RIC-T3/ETH main board are identified in *Figure 2-1*. The jumper settings are described in *Table 2-1*.

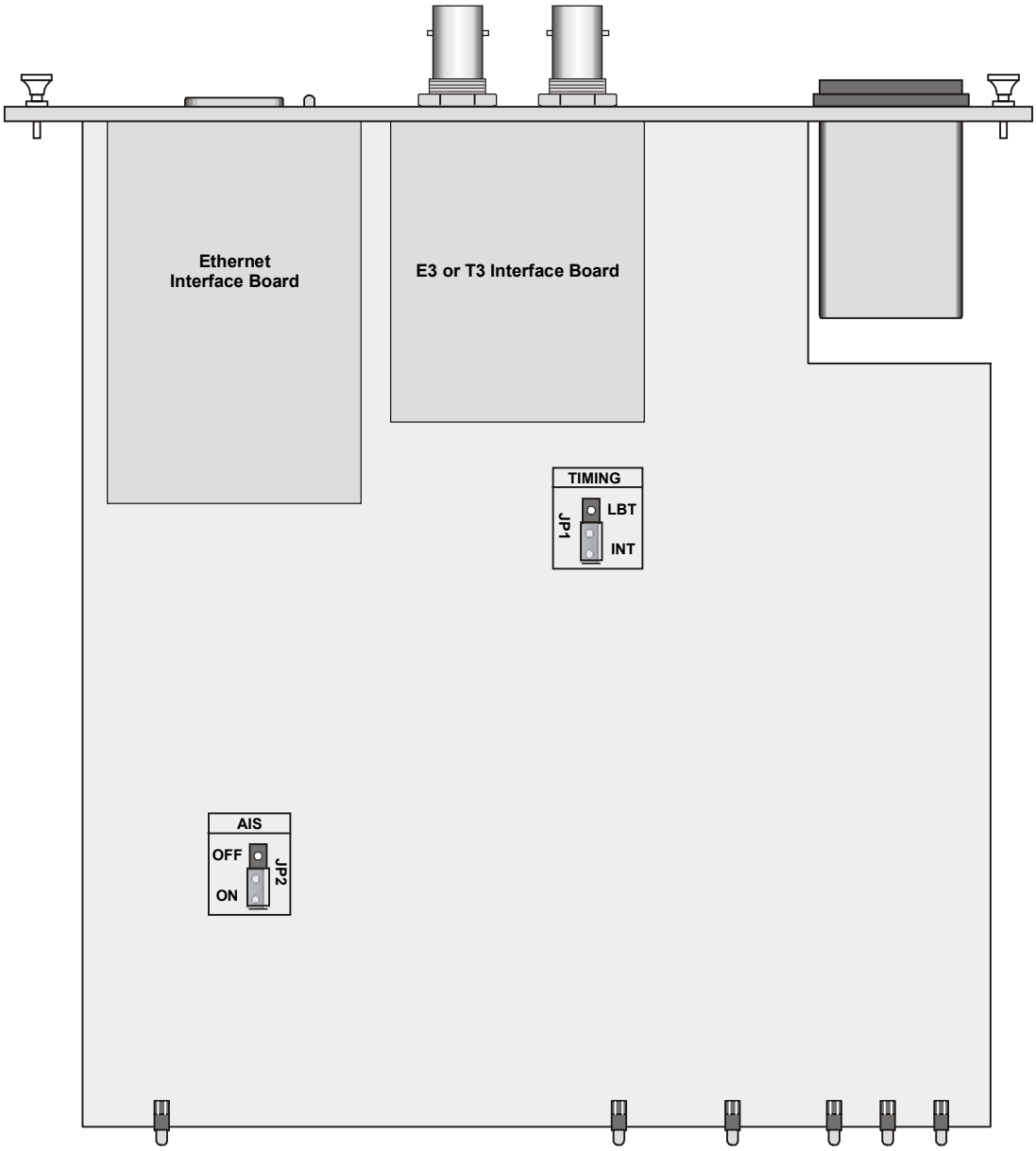

Figure 2-1. Main Board Layout

Table 2-1. Main Board Jumper Settings

Jumper	Description	Values	Factory Setting
TIMING, JP1	Selects the clock source	**LBT** – Receive clock	
		INT – Internal clock	INT
AIS, JP2	Controls the AIS transmission	**ON** – AIS is transmitted	ON
		OFF – AIS is not transmitted	

Setting the E3/T3 Interface Board Jumpers

The JP2 jumper, which is used for selection of the E3 cable length is located on the E3 interface board of RIC-E3/ETH (see *Figure 2-2* and *Table 2-2*).

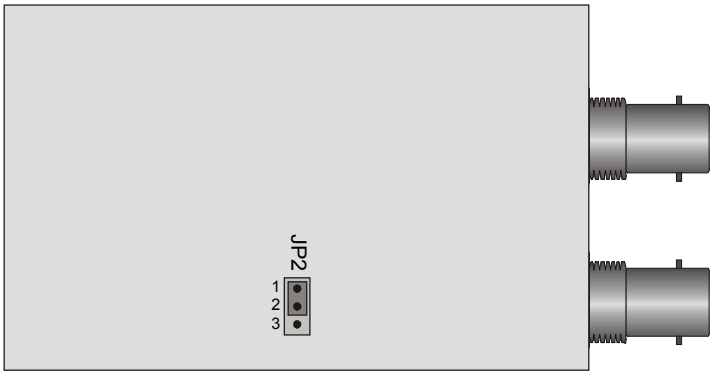

Figure 2-2. E3 Interface Board Layout

Table 2-2. Selecting the E3 Interface Cable

Jumper	Description	Values	Factory Setting
E3 Cable Length Jumper, JP2	Selects the E3 cable length	**Pins 1, 2** – Cable length is from 0 to 300 ft	Pins 1, 2
		Pins 2, 3 – Cable length is more than 300 ft	

***Note**: The maximum cable length complies with ITU-T G.703.*

The JP1, JP2 and JP3jumpers, which are used for selection of the T3 cable length are located on the T3 interface board (see *Figure 2-3* and *Table 2-3*).

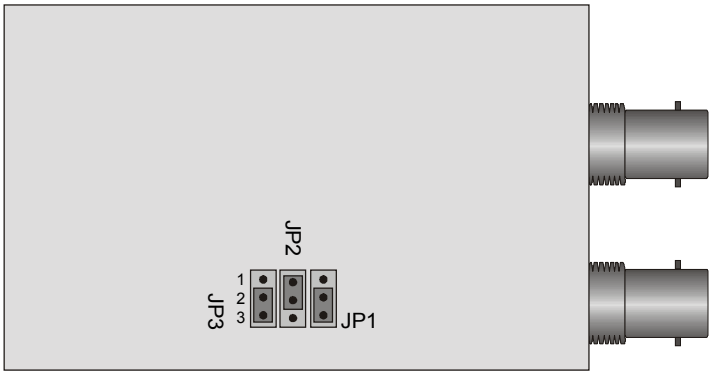

Figure 2-3. T3 Interface Board Layout

Table 2-3. Selecting the T3 Interface Cable

T3 Cable Length	Jumper Positions		
	JP1	**JP2**	**JP3**
0 ft – 225 ft	Pins 2, 3*	Pins 1, 2*	Pins 2, 3*
225 ft – 450 ft	Pins 1, 2	Pins 1, 2	Pins 1, 2
More than 450 ft	Pins 1, 2	Pins 2, 3	Pins 1, 2
***Note**: The maximum cable length complies with ITU-T G.703.*			

* – Factory settings

Setting the Ethernet Interface Board Switch

The Ethernet interface board of RIC-E3/ETH and RIC-T3/ETH contains a DIP switch, which is used for the bridge and LAN interface configuration (see *Figure 2-4* and *Table 2-4*).

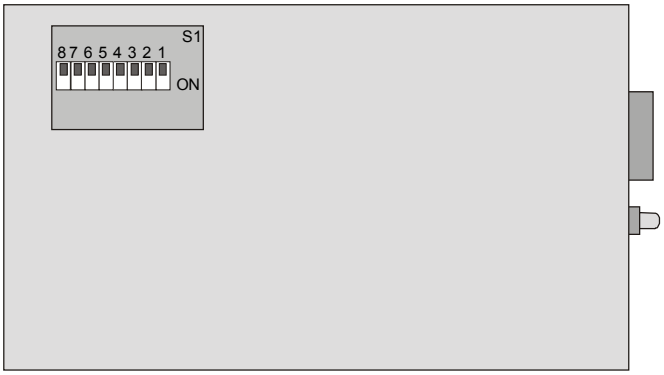

Figure 2-4. Ethernet Interface Board Layout

Table 2-4. Ethernet Interface DIP Switch Settings

Section	Name	Description	Possible Settings	Factory Setting
1	NC			OFF
2	FLC	Enables or disables flow control	**ON** – Flow control is enabled	
			OFF – Flow control is disabled	OFF
3	10/100	Selects the LAN speed	**ON** – LAN speed is set to 100 Mbps	
			OFF – LAN speed is set to 10 Mbps	OFF
4	AN1	Controls the LAN autonegotiation	**ON** – LAN autonegotiation is disabled	
			OFF – LAN autonegotiation is enabled	OFF
5	HF1	Selects the LAN mode	**ON** – LAN full duplex mode	
			OFF – LAN half duplex mode	OFF
6	BPR	Controls the backpressure	**ON** – Backpressure is enabled	
			OFF – Backpressure is disabled	OFF

Table 2-4. Ethernet Interface DIP Switch Settings (Cont.)

Section	Name	Description	Possible Settings	Factory Setting
7	MUL	Controls LAN to WAN multicasting	**ON** – Multicast messages from LAN to WAN are blocked	
			OFF – Multicast messages from LAN to WAN are not blocked	OFF
8	SCR	Controls the scrambling of Ethernet frames	**ON** – Ethernet frames are scrambled	
			OFF – Ethernet frames are left unchanged	OFF

Closing the Case

Once you finish the internal settings, you have to close the RIC-E3/ETH and RIC-T3/ETH case.

➤ **To close the RIC-E3/ETH or RIC-T3/ETH case:**

1. Slide the unit's interior back into the case.
2. Screw in the two rear panel screws to fasten the main board in the case.

Connecting the Interfaces

Figure 2-5 shows a typical rear panel of a standard RIC-E3/ETH unit and identifies connector locations for the AC version.
The RIC-E3/ETH and RIC-T3/ETH rear panels contain also LAN status indicators, which duplicate the front panel LAN LEDs. The LINK and ACT indicators are located on the Ethernet interface connector.

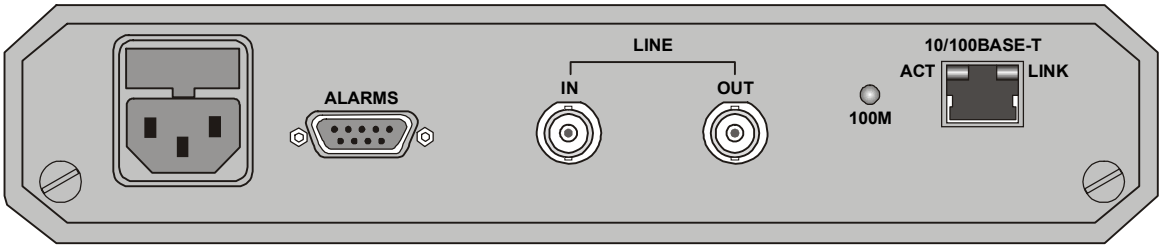

Figure 2-5. RIC-E3/ETH Rear Panel

Connecting the E3/T3 Interface

The E3/T3 interface of RIC-E3/ETH and RIC-T3/ETH terminates in two BNC coax connectors, designated IN and OUT.

➤ **To connect E3/T3 interface:**

1. Connect the receive line, using a 75Ω coaxial cable to the BNC connector labeled IN.
2. Connect the transmit line, using a 75Ω coaxial cable to the BNC connector labeled OUT.

Connecting the Ethernet Interface

The Ethernet interface of RIC-E3/ETH and RIC-T3/ETH terminates in an RJ-45 connector, designated 10/100BASE-T. *Table 2-5* lists the RJ-45 connector pinout.

➤ **To connect the Ethernet interface:**

- Connect the LAN to the RIC-E3/ETH or RIC-E3/ETH port, labeled 10/100BASE-T.

Table 2-5. RJ-45 Connector Pinout

Pin	Name	Function
1	RD (+)	Receive Data Positive
2	RD (-)	Receive Data Negative
3	TD (+)	Transmit Data Positive
6	TD (-)	Transmit Data Negative

Connecting the Power

To connect RIC-E3/ETH or RIC-E3/ETH to the power source, refer to the appropriate section below, depending on your version of the unit (AC or DC).

The units have no power switch. Operation starts when the power is applied to the rear panel POWER connector.

Before switching on this unit and connecting or disconnecting any other cable, the protective earth terminals of this unit must be connected to the protective ground conductor of the mains power cord. If you are using an extension cord (power cable) make sure it is grounded as well.

Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting of the protective earth terminal can make this unit dangerous. Intentional interruption is prohibited.

For the AC version, make sure that only fuses of the required rating, as marked on the rear panel, are used for replacement. Do not use repaired fuses or short-circuit the fuse holder. Always disconnect the mains cable before removing or replacing the fuse. Whenever it is likely that the fuse protection has been damaged, make the unit inoperative and secure it against unintended operation.

Connecting the AC Power

AC power should be supplied to RIC-E3/ETH and RIC-E3/ETH through the 1.5m (5 ft) standard power cable terminated by a standard 3-prong plug (see *Figure 2-5*). The cable is provided with the unit.

➤ **To connect AC power:**

- Connect the power cable first to the connector on the RIC-E3/ETH or RIC-E3/ETH rear panel, and then to the mains outlet.

  RIC-E3/ETH and RIC-E3/ETH will be turned on automatically upon connection to the mains.

Connecting the DC Power

➤ **To connect DC power:**

- Refer to *DC Power Supply Connection Supplement*.

Chapter 3

Operation

This chapter describes the RIC-E3/ETH and RIC-T3/ETH controls and indicators, and their functions, explains the units' operating procedures.

3.1 Front Panel Indicators and Controls

Figure 3-1 shows the front panel of RIC-E3/ETH. *Table 3-1* lists the functions of the RIC-E3/ETH LED indicators, located on the front panel.

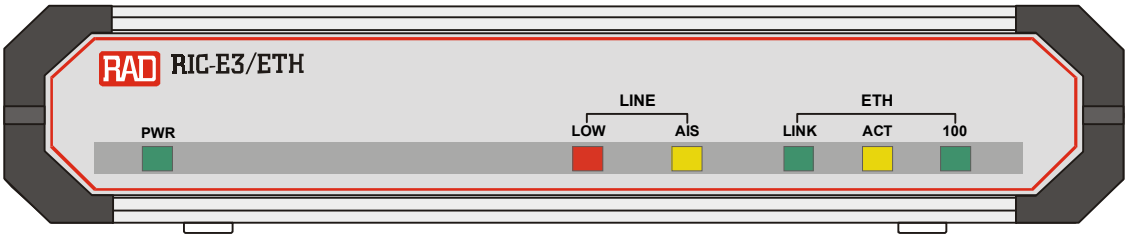

Figure 3-1. RIC-E3/ETH Front Panel

Table 3-1. RIC-E3/ETH and RIC-T3/ETH Controls and Indicators

Name	Type	Function
PWR	Green LED	ON – RIC-E3/ETH and RIC-T3/ETH is powered up
ELECTRICAL LOW	Red LED	ON – E3/T3 input signal is below the minimum level required (G.703)
ELECTRICAL AIS	Yellow LED	ON – E3/T3 interface received "All 1s" string
ETH LINK	Green LED	ON – LAN is connected to the Ethernet interface
ETH ACT	Yellow LED	ON – LAN is receiving/transmitting data
ETH 100	Green LED	ON – LAN is operating at 100 Mbps OFF – LAN is operating at 10 Mbps

3.2 Operating Instructions

Turning On

RIC-E3/ETH and RIC-T3/ETH start operating as soon as they are connected to the power source. The PWR LED turns ON and remains lit as long as the units are connected to the mains.

Normal Operating Instructions

The following LEDs conditions are observed during the normal operation:

- PWR is ON.
- LINK and ACT are ON to indicate data transfer over the Ethernet link.
- ETH 100 turns ON when RIC-E3/ETH and RIC-T3/ETH operate in Fast Ethernet (100 Mbps) mode.

The rest of the front panel LEDs are OFF.

Turning Off

Turn RIC-E3/ETH and RIC-T3/ETH off by disconnecting the power cord from the mains.

Chapter 4

Diagnostics and Troubleshooting

4.1 Alarm Relay

RIC-E3/ETH and RIC-T3/ETH include a dry contact alarm relay port supported via 9-pin connector for major and minor alarms. Major alarms are defined as E3/T3 electrical low levels. Minor alarms occur when an Alarm Indication Signal is received at the E3/T3 electrical interface. The dry contact port operates as Normally Open or Normally Closed, using different pins of the alarm relay port connector (see *Figure 4-1*).

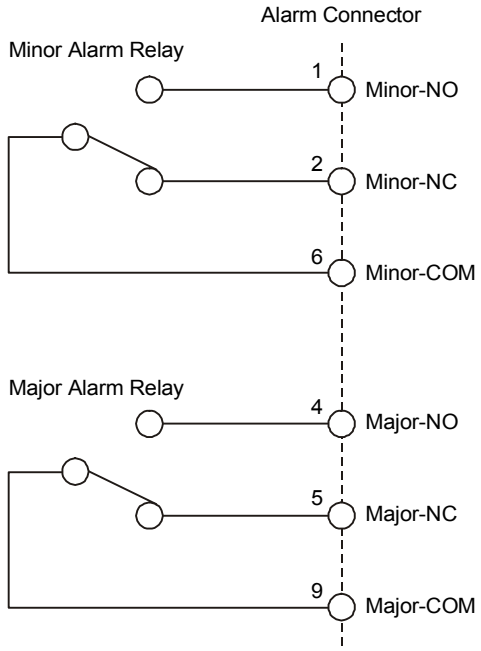

Figure 4-1. Alarm Relay Connector Pinout

Note *The relay positions are shown in the non-energized state (alarm active).*

4.2 Troubleshooting Instructions

In case a problem occurs, refer to *Table 4-1* for the troubleshooting procedures. Perform the actions listed under *Corrective Measures* in the order given in the table, until the problem is corrected.

Table 4-1. Troubleshooting Chart

Trouble Symptoms	Probable Cause	Corrective Measures
PWR indicator is OFF	No AC power	• Verify that the power outlet is providing the required power. • Ensure that the both ends of the power cable are connected properly.
	Blown fuse	Replace with a fuse of correct rating
ELECTRICAL LOW indicator is ON	One of the E3/T3 coaxial cables is defective or disconnected	Ensure that both ends of the E3/T3 coaxial cables are connected correctly and that the cables function properly.
	Attached equipment outputs do no comply with G.703 electrical levels	Check that the output levels of the equipment attached to the E3/T3 interface comply with G.703.
	JP2 is set incorrectly	Correct the JP2 settings according to *Table 2-1*.
ELECTRICAL AIS indicator is ON	Attached equipment transmits "All 1s" string	Check the equipment attached to E3/T3 interface, ensure that it transmits real data.

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SUPPLEMENT

DC Power Supply Connection – Terminal Block Connector

Note: Ignore this supplement if the unit is AC-powered.

Certain DC-powered units are equipped with a plastic 3-pin *VDC-IN* power input connector, located on the unit rear panel. Supplied with such a unit, is a mating Terminal Block (TB) type connector plug for attaching to your power supply cable.

Connect the wires of your power supply cable to the TB plug, according to the voltage polarity and assembly instructions provided below.

Caution: *Prepare all connections to the TB plug* ***before*** *inserting it into the unit's VDC-IN connector.*

Preparing and Connecting the TB Plug

Refer to Figure 1 for assistance.

1. Strip the insulation of your power supply wires according to the dimensions shown.
2. Place each wire lead into the appropriate TB plug terminal according to the voltage polarity mapping shown in *Figure 2.* (If a terminal is not already open, loosen its screw). Afterwards, tighten close the three terminal screws.
3. Pull a nylon cable tie (supplied) around the power supply cable to secure it firmly to the TB plug grip (pass the tie through the holes on the grip).

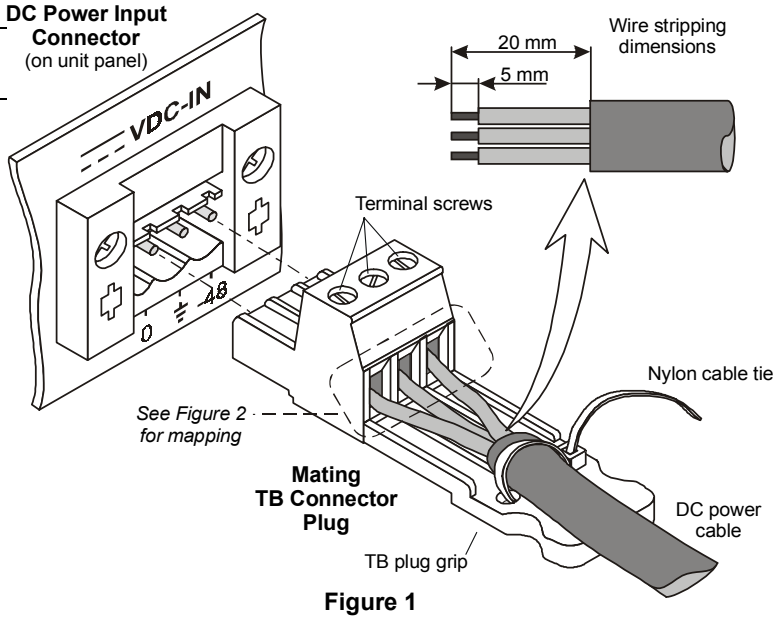

Figure 1

4. Isolate the exposed terminal screws/wire leads using a plastic sleeve or insulating tape, to prevent the possibility of short-circuit.
5. Connect the assembled power supply cable to the unit by inserting the TB plug into the unit's *VDC-IN* connector until it snaps into place.

DC Power Supply Wire Voltage Polarity

Refer to *Figure 2* for proper mapping of the power supply wire leads to the TB plug's three terminals.

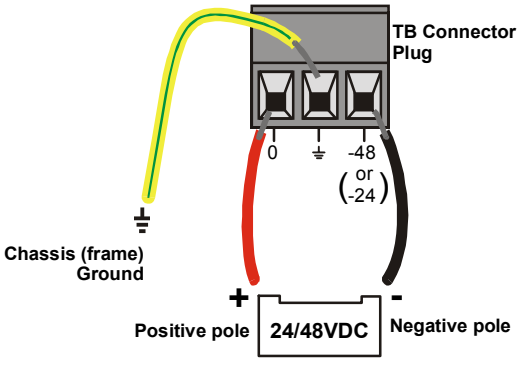

Figure 2

> ***Warning:***
> - *Reversing the wire voltage polarity can cause damage to the unit!*
> - *Always connect a ground (earth) wire to the TB plug's Chassis (frame) Ground terminal. Connecting the unit without a protective ground, or interruption of the grounding (for example, by using an extension power cord without a grounding conductor) can cause harm to the unit or to the equipment connected to it!*

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